the threads of the web to vibrate in turn, and that the spider is informed of the nearness of the instrument by the delicate sense of touch in the feet. But so far as my experience goes this hypothesis is not sufficient to account for the facts; for it is difficult to understand how the sense of touch in the feet can merely by being in contact with the threads, which by hypothesis are in a state of vibration, inform the spiders of the position of the fork and of the direction whence the sound proceeds. For of this, to judge by their actions, they appear to have a full knowledge. For instance, one adult example of *E. diademata* that I observed, responded in the manner above described when the fork was held over her back; but when the instrument was brought towards her ventral surface on the other side of the web she drew her body away from it, standing as it were on the tips of her toes. Again, when the fork was brought from below to within a distance of an inch and a half or two inches of a *Meta* suspended by a thread from her web, she instantly dropped again. In this case it is hard to believe that from such a position the fork could throw the web into a state of vibration. On the other hand, no example of the Epeiridæ could ever be attracted along one of the radii of the web, however close the fork was held to it, unless the two were actually in contact. In view of these facts, it seems to me probable that Mr. and Mrs. Peckham's explanation of the behaviour of the Epeiridæ—namely, that they hear the vibration—is the true one.

R. I. POCOCK.

NOTES.

THE Royal Society's medals have this year been adjudicated by the President and Council as follows:—The Copley Medal to Sir George Gabriel Stokes, Bart., F.R.S., for his researches and discoveries in physical science; a Royal Medal to Prof. Arthur Schuster, F.R.S., for his spectroscopic researches, and his researches on disruptive discharge through gases and on terrestrial magnetism; a Royal Medal to Prof. Harry Marshall Ward, F.R.S., for his researches into the life history of fungi and schizomycetes; and the Davy Medal to Messrs. J. H. van't Hoff and J. A. Le Bel, in recognition of their introduction of the theory of asymmetric carbon, and its use in explaining the constitution of optically active carbon compounds. Her Majesty the Queen has been graciously pleased to approve of the award of the Royal Medals. The medals will, as usual, be presented at the anniversary meeting on St. Andrew's Day (November 30). M. Le Bel has promised to attend in person, and it is hoped that all the medallists will be present. The Society will dine together at the Whitehall Rooms on the evening of the same day.

BY the death of Sir Andrew Clark, on the 6th inst., the medical profession has lost one of its most prominent members. The Royal College of Physicians has to mourn the decease of its President, and, outside the faculty, a large and distinguished section of the community is affected by it. Sir Andrew was born on October 28, 1826, at Aberdeen, and pursued his medical career there and at Edinburgh. Subsequently he entered the Royal Navy as a surgeon, and, after making a few voyages, became pathologist to the Royal Naval Hospital at Haslar. There he met Prof. Huxley, who was then professor of biology at the hospital school. In 1853 he accepted the curatorship to the museum of the London Hospital, and was afterwards appointed pathologist to the hospital, then lecturer on physiology, and in 1866 full physician. After this Sir Andrew rapidly came to the front, and from the first his connection was composed largely of men distinguished in science, art, and literature. In 1883 Her Majesty recognised his position in the profession, and his services to medical science, by conferring upon him the honour and title of a baronetcy. Five years later he was elected to succeed Sir William Jenner as President of the Royal College of Physicians, an honour that he valued even more highly than Royal favours. He was a Fellow of the Royal Society, an LL.D. of Aberdeen, Cambridge, and Edinburgh, and honorary M.D. of Dublin. The respect in which he was held is shown by the influential and representative character of the assembly at a commemorative service in Westminster Abbey on Saturday. The pall-bearers included the Prime Minister, Sir Henry Acland (Regius Professor of Medicine at Oxford), Sir James Paget (Vice-Chancellor of London University), Mr. John Whitaker Hulke (President of the Royal College of Surgeons), Sir Richard Quain (President of the General Medical Council, representing by request of the Provost the University of Dublin), and Sir Edward Sieveking. Following these, with the officers of the Royal College of Physicians, came representatives of the Universities, State departments, and various institutions. Prof. Clifford Allbutt attended for Cambridge, Sir Joseph Fayrer for Edinburgh, Dr. Farquharson, M.P., for Aberdeen, Mr. J. N. Dick for the Navy Medical Department, Sir William Mackinnon for the Army Medical Department, Dr. Thorne Thorne for the Medical Department of the Local Government Board, Sir William Flower for the British Museum, and Prof. Michael Foster for the Royal Society. Among the large congregation were Prof. Huxley, Sir Spencer Wells, and Sir Walter Phillimore. Honoured in life, Sir Andrew Clark's memory will be cherished by all acquainted with his wonderful energy, devotion to duty, and self-sacrifice—attributes worthy of emulation by all followers of his noble profession.

THE death of Dr. H. A. Hagen, a well-known entomologist is announced from New York. He was born in Königsberg in 1817, and became an assistant to Agassiz in 1867. Three years later he was appointed Professor of Entomology at Harvard College. It can truly be said that his works furnish a monument to his memory, for he made more than four hundred contributions to scientific literature.

WE have to record that Mr. A. Reckenzaun died on November 11, at the age of forty-three. His name is familiar in connection with papers on accumulators, electric traction, and electric locomotives, for certain of which he was awarded medals by the Society of Arts and the Institution of Electrical Engineers.

WE regret to learn from Sydney of the death of Dr. George Bennett, a distinguished naturalist, and the author of "Wanderings in New South Wales" and other works. He was ninety years of age.

THE death is announced of Mr. J. G. Barford, the author of a number of papers on physiological chemistry.

IN January next, the Botanical Society of Italy will take over the *Nuovo Giornale Botanico Italiano*, at present edited by Prof. T. Carnel, and publish it as the official organ of the Society. No modifications will be made, however, in the character of the journal, which will continue to be issued in quarterly numbers.

A meeting of representatives of technical schools was held at Manchester on the 4th inst., and it was resolved "that it is desirable that an Association of Technical Institutions be formed." With a view to formally constituting the proposed Association, a meeting will be held at the Society of Arts, on Friday, January 26, 1894.

THE new institute of science, art, and literature, established by the corporation of Carlisle at a cost of about £20,000, was opened by the mayor of that city on November 8. The institute includes a museum, a school of science and art, and a free library. In addition to a valuable collection of antiquities, the museum contains a good collection of stuffed birds, the late Prof. Harkness's collection of fossils, and a number of specimens of rocks of the English Lake district.

IT is reported that a seam of good coal has been discovered at Port Jackson, at a depth of 3000 feet below the surface.

AT the second meeting of a conference of the General Lighthouse Authorities of the United Kingdom and their engineers, together with representatives of the Admiralty and Board of Trade, held at the Trinity House on November 10, it was decided to publish in the official list of lights the candle-power of each light as determined by the engineers. By this means mariners will be informed of the relative illuminating powers of all the principal lights on the coast.

A CORPORATION has been formed at Chicago for the purpose of creating and sustaining a museum (says the *American Naturalist*). Prof. F. W. Putnam has been appointed managing director of the scheme. It is expected that he will organise the museum into departments, and will place over each a competent head, who will make it a medium of original research as well as of exhibition.

AT the annual meeting of the New York Mathematical Society, to be held on December 28, Prof. Simon Newcomb will deliver an address on "Modern Mathematical Thoughts."

THE fifth of the Gilchrist Lectures, in connection with the Bethnal Green Free Library, will be given on Thursday, 23rd, in the Great Assembly Hall, Mile End Road, by Dr. R. D. Roberts, his subject being "The Evolution of the British Isles."

THE Christmas course of lectures for juveniles will this year be delivered at the Royal Institution by Prof. Dewar. The subject will be "Air, Gaseous and Liquid," and the first lecture will be delivered on Thursday, December 28.

THE following science lectures will be delivered at the London Institution during the ensuing session: "Birds—Ancient and Modern," by Dr. B. Bowdler Sharpe; "When and Why an Electric Spark Oscillates," by Prof. C. V. Boys; "Crabs," by Prof. W. F. R. Weldon; "The Pond and its People," by the Rev. Dr. Dallinger. Mr. Shelford Bidwell will discourse on "Some Optical Phenomena"; Mr. J. J. H. Teall, on "The Life History of a Mountain Range"; Dr. Klein, on "Cholera," and Prof. Vivian Lewes, on "The Chemistry of Cleaning." The Christmas course for juveniles will be given by Mr. H. J. Mackinder.

IN an interesting report, presented to the Department of Agriculture of New South Wales, Mr. A. Sidney Oliff, the Government Entomologist, deals with the injuries inflicted on the sugar-cane crops in the Clarence River district by the ravages of insects. He finds the larger part of the injury to be due to the attacks of the larva of a moth, the sugar-cane moth borer, *Nonagria exitiosa*, but that its increase is kept in check by two minute hymenopterous parasites, both hitherto undescribed; one, *Apanteles Nonagriæ*, belonging to the Ichneumonidæ, the other, *Euplectus Howardi*, to the Chalcididæ.

TWO recent publications of the Board of Agriculture deal with experiments in checking potato disease in the United Kingdom and abroad. The history and cause of the potato disease are first explained, and a great variety of experiments are described in detail. They form a useful manual for agriculturists in their fight against the *Peronospora*.

MR. J. H. HART, the Superintendent of the Royal Botanic Gardens, Trinidad, has recently been successful in transporting to Nicaragua a selection of the best varieties of Trinidad "cacao." Cacao seed soon loses its vitality, and can only be safely transported long distances by placing it in a suitable position to germinate and grow on the voyage. On April 25 of this year, Mr. Hart left Trinidad with a number of specially-prepared cases containing plants, and seeds planted on the day of departure. The boxes in which the seeds were sown had not glass roofs, but were strongly latticed and covered with a movable sail-cloth cover which could be easily and rapidly fastened or unfastened, to give light, or to protect from wind, rain, and sun. A frame covered with wire-netting was fastened inside each case, so as to press upon the surface of the soil to prevent it shifting and causing the seeds to be disturbed. The seeds germinated ten days after planting, and on June 10, Mr. Hart reached his destination with more than 26,000 healthy plants, which were successfully put out in nurseries. A number of cacao seeds were sown at Nicaragua to develop during the return voyage, and, upon arriving at Trinidad, good healthy plants were obtained from ninety-eight per cent. of the seeds planted. These plants included two species entirely new to Trinidad, and their introduction may eventually prove of great benefit to the colony.

DR. KARL A. VON ZITTEL, Professor of Palæontology in the University of Munich, has at length completed the final volume of his comprehensive "Handbook of Palæontology." The first three volumes are already familiar to all students of palæontology, the fourth volume is devoted to the group of Mammalia. In the *Geological Magazine* for the months of September, October, and November, Dr. G. J. Hinde gives a translation of the concluding chapter, entitled, "On the Geological Development of the Mammalia." The palæontological record from Triassic to recent time is there summarised for the various continents, and Prof. von Zittel advances many additional data in support of Huxley's opinion that the *four* zoogeographical kingdoms of A. R. Wallace, the Palæarctic, Nearctic, Ethiopic, and Indian, form in point of fact but *one* great area of development—the Arctogean. This is the youngest of three areas of mammalian development; the oldest is the "Australian," which was separated from other continents as early as Mesozoic time, while the "South American" area dates as far back as early Tertiary.

A PAPER, by Mr. C. T. Simpson, on some fossil Unios and other fresh-water shells from the drift at Toronto, Canada, is contained in the Proceedings of the U.S. National Museum, vol. xvi. Mr. Simpson finds that the Unio fauna of the Mississippi Valley is remarkably distinct, being nearly related only to a part of that of North-Eastern Asia. It can be traced back to the Laramic group of the Cretaceous in an almost unbroken line of species. Glacialists will be interested in the following conclusion:—"The theory founded by Agassiz and elaborated by Dawson, Upham, Gilbert, Tyrrell, and others, that during the glacial period the archæan region of Canada was elevate from 1,000 to 2,000 feet above its present level, and that it was covered with an ice mantle from 3,000 to 6,000 feet thick, a mantle which in the eastern part of the United States extended down to latitude 38° or 40°; that in the Champlain period which followed there was a subsidence over this area, during which great lakes were formed by the melting ice, whose northern shores were the yet remaining wall of ice, and whose southern borders were the land that sloped northward; and that they drained into the Mississippi system, is most strongly confirmed by the evidence of these fossil Unios, and by every fact of the distribution of the Naiades in this general region to-day. It is believed that the entire system of the present Great Lakes was united, and that at one time it covered a considerable part of Lower Michigan, and extended well into Ohio, Indiana, and Illinois."

The great importance attaching to an accurate knowledge of the precise instant at which an earthquake shock is felt at a given station, has led Dr. A. Cancani, of the Rocca di Papa Geodynamic Observatory, to construct a seismograph which registers the time of the occurrence by an instantaneous photograph of a chronometer. From its description in the November number of *L'Elettricista*, it appears that the face of the chronometer is photographed by the light of an incandescent lamp, lighted for about a quarter of a second by a current established automatically by the shock. A lever of the first order carries on one arm nine small vessels containing potassium bichromate solution, whilst the other arm rests on the armature of an electro-magnet. The latter is connected to all the seismoscopes of the observatory, any one of which may establish the circuit and cause the armature to be attracted down. This raises the bichromate vessels and immerses the zinc-carbon couples fixed above them, thus supplying the lamp with a current. The closing of the circuit releases the lever, and the apparatus is automatically rearranged for the next shock.

An improved form of rotary air-pump has been constructed by Herr F. Schulze-Berge, and is described and illustrated in *Wiedemann's Annalen.* That chief difficulty in rotary air-pumps, the air-tight junction between the rotating and the stationary parts, has been overcome in a manner which is simple, ingenious, and very efficient. The tube from the vessel to be exhausted is led through the bottom of an inclined cylindrical vessel filled with mercury. A somewhat larger tube, forming the shaft of the rotating pump, reaches nearly to the bottom of the vessel, and surrounds the end of the first tube in such a manner that there is free communication between the two tubes, whilst all communication with the outer air is intercepted by the mercury. This mercury stuffing, while causing no friction, is found to be effective even at the highest vacua. The rotating tube is surrounded by another, which embraces the cylindrical vessel, and revolves on it with an air-tight junction formed by an ordinary stuffing-box or another mercury junction. The interior of this outer tube is exhausted by an auxiliary pump, so as to keep the difference of level in the mercury vessel small. The shaft carries a circular tube rotating in an inclined plane, about one-third of the tube being filled with mercury. This mercury forms a kind of piston for drawing the air out of the inner shaft, and driving it into the outer one and into the auxiliary pump. The tubular ring is interrupted in one place by a mercury valve, consisting of a U-tube or two concentric tubes parallel to the shaft, one of which communicates with the inner shaft and the recipient, the other leading into the space between the two shafts. In an improved form of the apparatus two concentric tubular rings are used, so that the space to be exhausted is separated by the mercury valve from another exhausted to nearly the same extent. The vacua obtained with this pump are beyond the limits of accurate measurement by McLeod's apparatus, and they are obtained much more rapidly than by other mercury pumps. A pump with rings of 60 cm. diameter and a capacity of 0·9 litre could be driven mechanically at a speed of 15 revolutions per minute. The inventor is constructing a pump of 8·5 litre capacity for industrial purposes.

The *Electrician* contains a description of a method for comparing the capacities of two condensers when they are of so small capacity that it is impossible to obtain, by the ordinary direct deflection method, readings sufficiently large to be accurately measured. The apparatus used consists of an electrically driven tuning-fork, performing about 280 double vibrations per second, one limb of which is provided with a platinised style vibrating between two light platinised springs, whose movements are damped so that their individual vibrations may not conflict with those of the fork. These springs are adjusted relatively to the style on he fork, so that contact shall be made with them alternately, but that when the fork is at rest it shall not be in contact with either. One spring is connected to one pole of a battery, the other to one terminal of a galvanometer, and the fork to one terminal of the condenser, the other terminals of the battery, galvanometer and condenser being connected together. When the fork vibrates, it first charges the condenser, and then discharges it through the galvanometer. The succession of impulses being so rapid (280 per second), the effect upon the galvanometer is nearly that of a continuous current, and the deflection is steady. It is possible with this arrangement to measure the capacity of a person who is insulated from the floor, and to note the increase of capacity due to the approach of other (uninsulated) persons to him.

L'Elettricista for November contains a paper, by Signor G. Brucchietti, on the effect of the absorption of hydrogen on the thermo-electric power and electrical resistance of palladium. The author finds that the resistance of a wire of palladium containing hydrogen increases in proportion to the quantity of hydrogen absorbed, and that when it is saturated the resistance is 1·55 times as great as it was before being charged with the hydrogen. If the same wire is repeatedly saturated with, and freed from hydrogen the resistance seems to tend towards a constant value (whether hydrogen is present or not), which is intermediate between the resistance before being charged, and that after being charged for the first time. In the experiments on thermo-electric force the author used a couple consisting of palladium and nickel, and found that the thermo-electric force of this couple increased with the amount of hydrogen absorbed by the palladium. When the palladium is saturated, the thermo-electric force of the couple is 1·66 times as great as it was before the palladium was charged. In a thermo-electric couple formed of charged and uncharged palladium the current at the cold junction was found to go from the charged to the uncharged palladium. This result is contrary to that obtained by Knott, and the author supposes the divergence to be due to impurity in one or other of the samples of palladium employed.

An exhaustive study of a problem belonging to the mathematical side of chemistry appears in the current number of the *Annales de Chimie et de Physique*. Here M. Lemoine investigates the influence of heat, unaffected by that of light, on the reactions which take place in aqueous solutions containing ferric chloride and oxalic acid. When these substances are present in equivalent proportions, the interaction is irreversible, and proceeds according to the equation, $2FeCl_3 + H_2C_2O_4 = 2FeCl_2 + 2HCl + 2CO_2$. At any temperature the rate at which decomposition takes place is found to follow the well-known law of mass action, which states that the amount of substance which is being decomposed at any instant is proportional to the amount of unchanged substance contained in unit volume of solution. The rate of change, concentration remaining the same, is found to vary to a most marked extent with variation in temperature. Thus at 100°, in one hour ·16 of the original amount of substance was decomposed, whereas at ordinary temperatures after six years only ·019 equivalents had reacted. The presence of water accelerates the velocity of change according to a law which varies slightly with the temperature, a slight excess of oxalic acid accelerates the rate, a large excess of oxalic acid or of ferric chloride retards it. Excess of concentrated hydrochloric acid almost completely arrests the reaction. The effects which these and other materials exert upon the course of the simple reaction, the author studies both by chemical and thermochemical methods, and shows that they may be explained by the occurrence of secondary reactions. The communication, which extends over more than 100 pages, serves to give some idea of the patient labour involved in elucidating the mechanics of what appears at first sight to be a comparatively simple case of chemical decomposition.

The Calendar of the University College of Nottingham for the thirteenth session, 1893–94, has just been issued.

A "Bibliography of the Chinookan Languages" (including the Chinook jargon) has been prepared for the Bureau of Ethnology, Washington, by Mr. J. C. Pilling.

Messrs. Perken, Son, and Rayment have published the eighteenth edition of a little book on "Intensity Coils," and the second edition of "The Magic Lantern: its Construction and Use." Both books are suited to the wants of the scientific amateur.

Mr. Albert F. Calvert presents, in his "Mineral Resources of Western Australia" (George Philip and Son), an array of facts of particular interest to the capitalist and emigrant. Beneath the surface of that country lie belts and reefs of gold-bearing rocks sufficient to satisfy the most avaricious, and Mr. Calvert is desirous that the profuseness of these and like mineral deposits should convince people that the country offers "mighty possibilities" to enterprise.

Dr. M. C. Cooke's "Romance of Low Life among Plants," published by the Society for Promoting Christian Knowledge, is an interesting and very readable book on cryptogamic vegetation. Though written in language "understanded of the people," and full of romantic beliefs connected with plants in a bygone age, scientific accuracy is not sacrificed, and scientific words are not strictly tabooed, as they usually are in the diffuse books designed for the popular palate. A larger number of illustrations would render the book still more interesting and valuable.

Dr. A. R. C. Selwyn, C.M.G., F.R.S., the Director of the Geological Survey of Canada, has had a catalogue prepared of the fine stratigraphical collection of Canadian rocks exhibited by the Survey Department at the Columbian Exposition. The collection comprised 1500 specimens, illustrating all the formations known to occur in the Dominion of Canada, from the Laurentian to the Pleistocene. Mr. W. F. Ferrier gives a few explanatory notes with regard to the rocks represented in the collection.

If the number of books published on a particular subject can be regarded as an indication of the interest taken in that subject, we are led to the gratifying conclusion that physical laboratories are rapidly increasing. Books dealing with practical physics are constantly being published, and the last received by us—"Practical Work in Heat," by Mr. W. G. Woollcombe (Clarendon Press)—shares the generally excellent character of works of its kind.. It is now believed by all men of science that physics cannot be properly taught by lectures alone, any more than chemistry, and the belief is slowly but surely causing our schools and colleges to give facilities for such necessary practical work. Mr. Woollcombe's book includes sections on thermometry, expansion, calorimetry, evaporation, and radiation. Excellent experiments are described in each section, and their performance does not necessitate the use of expensive apparatus. In fact, the book contains a practical course in heat that we should like to see introduced into every school which includes physical science in its curriculum.

Compounds of carbon monoxide with potassium and sodium respectively have been obtained by M. Joannis, by the action of gaseous carbon monoxide upon solutions in excess of liquefied ammonia of the peculiar compounds which potassium and sodium form with ammonia. M. Joannis has for several years been investigating the nature and reactions of these latter compounds, potassammonium and sodammonium, and the results of his researches have been referred to in previous notes (see Nature, vol. xliii. p. 399, and vol. xlv. p. 158). The reactions which occur between these substances and carbon monoxide are of a most interesting character, throwing light as they do upon the nature of the dangerously explosive compound of potassium and carbon monoxide which formerly produced such deplorable accidents during the commercial production of metallic potassium by the method of Brunner. A considerable number of investigations have been carried out with the object of obtaining a complete knowledge of this explosive substance, but the results arrived at can scarcely be termed concordant. Most of the investigators agree in assigning to it the simple formula KCO, but the descriptions of its properties are very diverse. Liebig and likewise Lerch describe it as a black powder, while Brodie endows it with a red colour. The latter chemist found it to react in a most violent manner with water, while Liebig's substance was much more gentle in its demeanour towards that solvent, and actually permitted of the application of a moderate heat with no more serious result than quiet inflammation. More recently Nietzki and Beuckiser have described it as not only explosive but as detonating, when exposed to the moist atmosphere, under the influence of the least concussion in its neighbourhood. The potassium compound now described bears most resemblance to the unstable substance of Brodie and of Nietzki and Beuckiser, although differing in several particulars. The analogous sodium compound does not appear to have been previously obtained.

When dry carbon monoxide is allowed to bubble through a solution in liquefied ammonia of potassammonium, the blue substance of the probable composition $(KNH_3)n$ produced by dissolving metallic potassium in liquefied ammonia, the containing vessel being cooled to − 50°, the deep blue colour gradually diminishes in intensity, and is eventually supplanted by a pale rose tint, the attainment of which signifies the completion of the interaction. Upon removal from the cooling mixture the liquefied ammonia gradually vaporises, depositing as it does so a rose-coloured powder which upon analysis proves to be pure potassium carbonyl KCO. When left undisturbed in a sealed tube for some time this pink powder darkens in colour, then answering very closely to the description of Brodie's substance. It cannot be heated to the temperature of boiling water, explosion ensuing considerably below that temperature. Detonation likewise occurs if the merest trace of air is admitted, and instantly when touched with a drop of water. Air and water both appear to act by causing such an elevation of temperature by their reaction with a small portion as to bring about sudden decomposition of the whole. It is, however, possible to study the reaction with water by admitting a drop of that liquid into an exhausted tube containing potassium carbonyl in such a manner as not to come into direct contact with the substance; the aqueous vapour then slowly reacts with the apparent production of deliquescence and the eventual formation of a yellow viscous liquid. The nature of this liquid is reserved for a future communication.

Sodium does not resemble potassium in directly uniting with carbon monoxide. Sodammonium $(NaNH_3)n$, is, however, readily decomposed by carbon monoxide with formation of sodium carbonyl, NaCO, a substance which may be isolated in a manner similar to that employed for the isolation of the potassium compound. It is a pale lilac-coloured substance which is powerfully explosive like its potassium analogue. Detonation ensues under the influence of small quantities of either air or water. Under the influence of heat its colour darkens, no gas is evolved, but about 90° sudden explosion occurs, and with such force that no glass has yet been found to withstand it. It also explodes like the potassium compound under the influence of percussion, although not quite so readily as the latter substance. The nature of the changes occurring in the explosion by percussion were ascertained by performing the reaction in a sealed tube of strong glass, also containing a few glass beads. The rattling of the beads was sufficient to induce explosion, and in one experiment out of a large number the tube remained intact. It was found that the products were all solid substances. The main reaction proceeds in accordance with the equation $4NaCO = Na_2CO_3 + Na_2O + 3C$. A small quantity of sodium cyanide was also produced. When a drop of water is introduced into a similar tube detonation immediately occurs, and the whole tube is filled with a red flame, the colour of which may perhaps be accounted for by the fact that a considerable quantity of hydrogen gas is liberated. The other products of the reaction are sodium carbonate, free carbon, and a small proportion of carbon monoxide. Water vapour, however, reacts in a quiet manner, as in the case of potassium carbonyl, the substance successively changing colour to brick-red, reddish-brown, and dark violet, until at length a viscous liquid of a deep red colour is produced, whose nature, together with that of the liquid derived from the potassium compound, M. Joannis is now investigating.

NOTES from the Marine Biological Station, Plymouth.—Last week's captures include a specimen of the fine Nemertine *Cerebratulus roseus*, now first recorded for the British Isles. There are clearly hosts of interesting forms in the deeper water off the Devon and Cornish coasts, if only we had a stout steamboat from which to dredge this rich locality. The floating fauna has not been rich, owing to the prevalence of northerly and easterly winds. The presence of *Radiolaria*, in spite of this, has been an interesting feature. Terebellid and Polynoid larvæ, *Sagitta*, and a few Ophiuroid *Plutei* have also been observed.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. James Kendal; a Hairy-nosed Wombat (*Phalascomys latifrons*, ♂) from South Australia, two Marabou Storks (*Leptoptilus crumeniferus*), a White-necked Stork (*Dissura episcopus*) from West Africa, a Javan Adjutant (*Leptoptilus javanicus*) from Java, presented by Mr. E. W. Marshall, F.Z.S.; a Macaque Monkey (*Macacus cynomolgus*, ♀) from India, presented by Mrs. B. E. F. Stevens; two and three Hedgehogs (*Erinaceus europæus*) British, presented respectively by Mr. W. Chatterton and Mr. A. S. Bird; two Herring Gulls (*Larus argentatus*) British, presented by Mr. B. Tremble; a Blossom-headed Parrakeet (*Palæornis cyanocephalus*, ♂) from India, presented by Mrs. Osmond Barnes; a White-handed Gibbon (*Hylobates lar.*, ♀) from the Malay Peninsula, deposited; a Mona Monkey (*Cercopithecus mona*, ♂) from West Africa, two Lapwings (*Vanellus vulgaris*), a Common Curlew (*Numenius arquata*) British, purchased; three Dingoes (*Canis dingo*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

BROOKS'S NEW COMET (1893*c*).—In the *Astronomical Journal* (No. 306), Prof. E. E. Barnard briefly describes a photograph of this new comet, which he was able to obtain with a 6-inch Willard lens. The exposure was made under conditions not very conducive to good results, owing to the low position of the comet and the presence of the zodiacal light. The negative exhibits, however, many points of interest, and its characteristic features are described as similar to those shown in the photographs of Swift's comet 1892 I. Prof. Barnard's description is as follows:—"The plate shows the tail to a distance of 3½°. This tail irregularly divides into two slightly divergent branches. There are two narrow straight rays springing out from the head on opposite sides, and nearly symmetrical with the main tail. The north ray, which seems to leave the region of the nucleus, is inclined to the body of the comet by about 45°; the southern, which leaves the comet 10′ or 15′ back of the head, is inclined about 30°. They are both about ½° long. There are faint evidences of several other rays from the southern side of the comet."

BIELA METEORS.—The return of the "Andromedes" this year is looked forward to with special interest, owing to their great abundance last year. It will be remembered that in 1892, instead of arriving on November 27 or 28, as was expected, the maxima occurred about the 23rd, or four days in advance of the predicted time, so that observers this year must be on the *qui vive* early. The director of the Pulkova Observatory, M. Bredichin, accounts for this retrograde motion by supposing it to be caused by the perturbations of Jupiter, which during 1890 were very great. Besides a retrogradation of the node amounting to 4°, the inclination of the orbit has largely diminished.

THE PLANET JUPITER.—Jupiter's red spot, although preserving its oval form, is very dim, and is less sharp than in preceding years. The general aspect of the disc seems to have sensibly undergone changes and shows many more details, as if the cloudy atmosphere of the planet had been more than usual disturbed. Numerous observers are now scanning his disc, and some recent results are contained in the current number of *L'Astronomie* (No. 11). M. Guiot has made a series of drawings which are there produced; they show how the equatorial belt has gradually advanced to the west relatively to a small black spot indicated in the drawing, and has consequently made the latter appear to have a motion in the opposite direction, *i.e.* eastwards. The motion is clearly shown by a change of inclination in a line connecting the same two spots in the series.

A NEW VARIABLE STAR.—The Rev. T. E. Espin announces from the Wolsingham Observatory that a red star (anonymous) at R.A. 19h. 7m. 16s., Decl. +25°·46, is variable. Its magnitude on August 21 was 9·0, but it has diminished to 11·0 mag. Photographs taken with the Compton telescope have confirmed the variability of Es. 329 (R.A. 19h. 59m. 6s., Decl. +36°·25).

THE "OBSERVATORY" FOR NOVEMBER.—In the current number of this monthly, Mr. T. Lewis concludes his interesting survey on the various methods of computing double-star orbits. Mr. H. H. Turner describes briefly a short method of obtaining a star's right ascension and declination from a photograph, the results being correct to less than a second of arc. Mr. Dunkin, in a letter to the editors, gives the text of the "Adams Memorial," lately placed in the north transept of Truro Cathedral, and erected at the expense of a few Cornish friends and admirers, both resident and non-resident, as a mark of their high esteem for him as an astronomer and mathematician, and also for the strong affection he always entertained to the end of his life for the hills and dales of his native county. The translation is as follows:—

In this place, as is his due,
We commemorate our own [West] countryman
John Couch Adams

Tracing his way
By the sure clue of Mathematics
Through the boundless night of space
He found the outermost of the planets.

Faithfully pursuing the paths of the Sciences
With single-hearted modesty and clearness of intellect,
He loved God Whom he saw in the Face of Christ

For him, as well as for Henry Martyn,
Cornwall and Cambridge
Owe each other mutual debts.

He died, dearly loved by all who knew him,
On the 21st of January 1892,
Aged 72 years, 7 months, 16 days.

SOLAR OBSERVATIONS AT CATANIA, ROME, &c.—Prof. Riccò, in the August number of the *Memoire della Societa degli Spectroscopisti Italiani*, gives a detailed account of the observations of solar protuberances observed at the Royal Observatory of Catania during the year 1892. The same number contains two of the large diagrams showing the sun's limb as observed at Catania, Palermo and Rome, one for February–March 1892, and the other for March–April of the same year.